

# Assembly Machines



2005

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Manuli Rubber Industries is a multinational group with a global organisation focused on the design, manufacture and distribution of fluid conveying rubber/metal components and systems for high pressure hydraulics and oil & marine applications.

With its 70 years of experience developing technical products, is recognized worldwide as a leader in terms of innovation, quality and performance.



Hose assembly machines presented in the catalogue are part of the Manuli product range, designed and realised according to high quality standards, assuring high performance and the safety of the operator in compliance with EC norms.

The use of the Manuli assembly machines is recommended for a proper hose assembly procedure, according to Manuli assembly instructions, considering safety aspects and requirements of high quality of the fluid connectors. The hose-fitting integration in fact is one of the most critical aspect of the hose assembly: many of the field problems are due to incorrect operations of assembly. Assembly machines are part of the intergated package offered by Manuli, are designed and optimised with the long experience of Manuli in the hydraulic sector.

Machines are tested and field validated with laboratory testing, large assembly productions and applications with standard and special products, small and large bore hoses as well.

The catalogue offers a guideline for the selection of the proper machine for the intended use; in fact a correct assembly operation is strictly connected with the machine and tooling used.

Our Sales Department and Technical Assistance Service are always available for consultancy in product selection.










Special machines non included in the present catalogue are available upon request, so as the original spare parts.







## MACHINE SELECTION GUIDELINES

Model	Machine type	Application sector	Indicative capacity	Machine performance
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### SWAGING MACHINES

	<b>MHP 80</b>	<b>hand pump, portable</b>	ON-SITE REPAIR	2wb: 1" max. 4ws: 1/2" max.	manual machine for small sizes
	<b>MHP 137</b>	<b>hand pump, portable</b>	ON-SITE REPAIR	2wb: 1.1/4" max. 4ws: 1.1/4" max.	manual machine for small/medium sizes
	<b>MB 137</b>	<b>benchtop</b>	AFTER MARKET SERVICE	2wb: 1.1/4" max. 4ws: 1.1/4" max.	medium swaging force, small/medium sizes, limited productivity
	<b>MB 137 S</b>	<b>benchtop</b>	AFTER MARKET SERVICE	2wb: 1.1/4" max. 4ws: 1.1/4" max.	medium swaging force, small/medium sizes, medium productivity
	<b>MB 240</b>	<b>benchtop</b>	AFTER MARKET SERVICE	2wb: 2" max. 4wb: 2" max. 6ws: 1" max.	medium swaging force, medium productivity
	<b>MB 340</b>	<b>benchtop</b>	AFTER MARKET SERVICE	2wb: 3" max. 4ws: 2" max. 6ws: 2" max.	high swaging force, medium productivity, large size OK
	<b>MV 240</b>	<b>for mobile van, electric 12/24V</b>	ON-SITE REPAIR MOBILE VAN	2wb: 2" max. 4ws: 2" max. 6ws: 1" max.	medium swaging force, limited productivity
	<b>MS 280</b>	<b>stand type</b>	ASSEMBLY PRODUCTION UNIT	2wb: 3" max. 4ws: 2" max. 6ws: 2" max.	high swaging force, high productivity, large size OK
	<b>MS 400</b>	<b>stand type</b>	ASSEMBLY PRODUCTION UNIT	2wb: 3" max. 4ws: 3" max. 6ws: 3" max.	very high swaging force, high productivity, very large opening


### CUTTING MACHINES

	<b>M22 CUT</b>	<b>benchtop</b>	AFTER MARKET SERVICE	2wb: 1.1/4" max. 4ws: 1" max.	medium size capacity
	<b>M30 CUT</b>	<b>benchtop</b>	AFTER MARKET SERVICE	2wb: 2" max. 4ws: 2" max. 6ws: 1.1/4" max.	wide hose range capacity
	<b>M75 CUT</b>	<b>stand type</b>	PRODUCTION UNIT	2wb: 3" max. 4ws: 2" max. 6ws: 2" max.	whole hose range capacity
	<b>M110 CUT</b>	<b>stand type</b>	PRODUCTION UNIT	2wb: 3" max. 4ws: 3" max. 6ws: 3" max.	whole hose range and large bore hose capacity

### SKIVING MACHINES

	<b>M205 SKY</b>	<b>stand type</b>	PRODUCTION UNIT	2wb: 2" max. 4ws: 2" max. 6ws: 2" max.	whole hose range capacity
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### INSERT PUSHING MACHINES

	<b>M1500 INS</b>	<b>benchtop</b>	PRODUCTION UNIT	from 1/4" to 2"	whole hose range capacity
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## MACHINES TECHNICAL SPECIFICATIONS

Model	Indicative capacity	Theoretical crimp force (t)	Number of swaging per hour	Max swaging dia. (mm)	Die stroke	Max die length (mm)	N° std. kit of die sets	Std. motor	Voltage options	Weight (kg)	Dimensions LxWxH (mm)
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### SWAGING MACHINES

<b>MHP 80</b>		2wb: 1" max. 4ws: 1/2" max.	<b>80</b>	<b>n/a</b>	<b>43</b>	<b>+ 20</b>	<b>56</b>	<b>-</b>	<b>n/a</b>	<b>n/a</b>	<b>28</b>	<b>330 250 400</b>
<b>MHP 137</b>		2wb: 1.1/4" max. 4ws: 1.1/4" max.	<b>137</b>	<b>n/a</b>	<b>56</b>	<b>+ 18</b>	<b>70</b>	<b>9</b>	<b>n/a</b>	<b>n/a</b>	<b>55</b>	<b>480 250 340</b>
<b>MB 137</b>		2wb: 1.1/4" max. 4ws: 1.1/4" max.	<b>137</b>	<b>450</b>	<b>56</b>	<b>+ 28</b>	<b>75</b>	<b>10</b>	<b>2.2 kW</b>	<b>220V 3ph, 220V 1ph, 12/24V</b>	<b>90</b>	<b>600 400 490</b>
<b>MB 137 S</b>		2wb: 1.1/4" max. 4ws: 1.1/4" max.	<b>137</b>	<b>850</b>	<b>56</b>	<b>+28</b>	<b>75</b>	<b>10</b>	<b>3.0 kW</b>	<b>220V 3ph, 220V 1ph, 12/24V</b>	<b>120</b>	<b>600 390 600</b>
<b>MB 240</b>		2wb: 2" max. 4wb: 2" max. 6ws: 1" max.	<b>240</b>	<b>625</b>	<b>76</b>	<b>+ 38</b>	<b>100</b>	<b>12</b>	<b>4.0 kW</b>	<b>220V 3ph, 220V 1ph, 12/24V</b>	<b>180</b>	<b>600 390 630</b>
<b>MB 340</b>		2wb: 3" max. 4ws: 2" max. 6ws: 2" max.	<b>340</b>	<b>850</b>	<b>130</b>	<b>+ 38</b>	<b>125</b>	<b>13</b>	<b>5.5 kW</b>	<b>220V 3ph, 220V 1ph,</b>	<b>270</b>	<b>690 465 790</b>
<b>MV 240</b>		2wb: 2" max. 4ws: 2" max. 6ws: 1" max.	<b>240</b>	<b>n/a</b>	<b>76</b>	<b>+ 38</b>	<b>100</b>	<b>12</b>	<b>2.0 kW</b>	<b>24V dc</b>	<b>125</b>	<b>500 450 580</b>
<b>MS 280</b>		2wb: 3" max. 4ws: 2" max. 6ws: 2" max.	<b>280</b>	<b>1850</b>	<b>130</b>	<b>+ 70</b>	<b>100</b>	<b>13</b>	<b>5.5 kW</b>	<b>220V 3ph</b>	<b>1300</b>	<b>1060 865 1500</b>
<b>MS 400</b>		2wb: 3" max. 4ws: 3" max. 6ws: 3" max.	<b>400</b>	<b>1400</b>	<b>160</b>	<b>+ 85</b>	<b>125</b>	<b>13</b>	<b>5.5 kW</b>	<b>220V 3ph</b>	<b>2000</b>	<b>1260 930 1690</b>


### CUTTING MACHINES

			Rotation speed (rpm)	Blade diam. (mm)	Motor	Voltage options	Weight (kg)	Dimensions LxWxH (mm)
<b>M22 CUT</b>		2wb: 1.1/4" max. 4ws: 1" max.	<b>3000</b>	<b>300</b>	<b>2.2 kW</b>	<b>220V 3ph</b>	<b>36</b>	<b>500 520 650</b>
<b>M30 CUT</b>		2wb: 2" max. 4ws: 2" max. 6ws: 1.1/4" max.	<b>3000</b>	<b>300</b>	<b>3.0 kW</b>	<b>220V 3ph</b>	<b>57</b>	<b>650 420 700</b>
<b>M75 CUT</b>		2wb: 3" max. 4ws: 2" max. 6ws: 2" max.	<b>3000</b>	<b>520</b>	<b>7.5 kW</b>	<b>220V 3ph</b>	<b>215</b>	<b>910 820 1280</b>
<b>M110 CUT</b>		2wb: 3" max. 4ws: 3" max. 6ws: 3" max.	<b>3000</b>	<b>600</b>	<b>11.0 kW</b>	<b>220V 3ph</b>	<b>260</b>	<b>960 870 1350</b>

### SKIING MACHINES

			Rotation speed (rpm)	Motor	Voltage options	Weight (kg)	Dimensions LxWxH (mm)
<b>M205 SKY</b>		2wb: 2" max. 4ws: 2" max. 6ws: 2" max.	<b>205</b>	<b>0.75 kW</b>	<b>220V 3ph</b>	<b>130</b>	<b>1130 580 550</b>

### INSERT PUSHING MACHINES

			Max hose OD (mm)	Feeding compressed air	Weight (kg)	Dimensions LxWxH (mm)
<b>M1500 INS</b>		from 1/4" to 2"	<b>73</b>	<b>7 bar</b>	<b>70</b>	<b>750 660 300</b>

### HP 80

#### MANUAL SWAGING



DIE SIZES			TECHNICAL SPECIFICATIONS		
N.	Swaging range	L (mm)	Swaging range	mm	12 - 43
12	12.0-15.0	56	Die stroke	mm	+ 20
15	15.0-18.0	56	Master die shoe length	mm	56
18	18.0-21.0	56	Hand pump	bar	350 (double speed)
21	21.0-24.0	56	Swaging force	kN	800
24	24.0-27.0	56	Dimensions:		
27	27.0-30.0	56	Length	mm	330
30	30.0-39.0	56	Width	mm	250
39*	39.0-43.0	56	Height	mm	400
			Weight (with oil)	kg	28

\* master die size

### MAIN APPLICATIONS

Portable unit, hand pump machine, dedicated to on-site repairs: small repair shops for hydraulics and agriculture machines, hardware stores, general resellers.

It is a second machine for maintenance specialists to carry out on site repairs.



### KEY PERFORMANCE

Compact ▪ Light ▪ Balanced and easy handling ▪ Protection of the cylinder with pads between the master dies ▪ 350 bar technology: more robust than 700 bar ▪ Dual stage pump ▪ Recommended for on site repair ▪

### APPLICABLE PRODUCT RANGE

HOSE TYPE	FITTING TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>1"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>1/2"</b>	Goldenspir/12 & /4SP, Rockmaster/12 & /4SP, Shieldmaster spiral (6000 DN 10 & 12)
	MF2000 InterLock, Xtralock	<b>Not applicable</b>	
<b>6 wire spirals</b>	MF3000 OPS	<b>Not applicable</b>	—
	MF2000 InterLock, Xtralock		

**WARNING:** Possible limitations in case of double elbow assembly.

## PORTABLES

### HP 137 MANUAL SWAGING



DIE SIZES			TECHNICAL SPECIFICATIONS		
N.	Swaging range	L (mm)	Swaging range	mm	4 - 56
12	12.0-15.0	56	Die stroke	mm	+ 18
15	15.0-18.0	56	Master die shoe length	mm	60
18	18.0-21.0	56	Hand pump	bar	350 (double speed)
21	21.0-24.0	56	Swaging force	kN	1370
24	24.0-27.0	56	Dimensions:		
27	27.0-30.0	56	Length	mm	480
30	30.0-33.0	56	Width	mm	250
33	33.0-36.0	70	Height	mm	340
36	36.0-39.0	70	Weight (with oil)	kg	55
39	39.0-45.0	70			
45	45.0-51.0	70			
51	51.0-56.0	70			

### MAIN APPLICATIONS

Portable unit, hand pump machine for small and medium size hoses, dedicated to small repair shops for hydraulics and agriculture machines, hardware stores, general resellers.

It is a second machine for maintenance specialists to carry out on site repairs.



### KEY PERFORMANCE

Compact ▪ High swaging force for manual machine ▪ Short head ▪ Protection of the micrometer and of the cylinder ▪ 350 bar technology: more robust than 700 bar ▪ Dual stage pump ▪ Visual/sound signal when crimp size is reached ▪

### APPLICABLE PRODUCT RANGE

HOSE TYPE	FITTING TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>1.1/4"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>1.1/4"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex
	MF2000 InterLock, Xtralock	<b>3/4"</b>	
<b>6 wire spirals</b>	MF3000 OPS	<b>Not applicable</b>	—
	MF2000 InterLock, Xtralock		

**WARNING:** Possible limitations in case of double elbow assembly.



### MB 137

#### WORKSHOP SWAGING



DIE SIZES			TECHNICAL SPECIFICATIONS		
N.	Swaging range	L (mm)	Swaging range	mm	4 - 56
12	12.0-15.0	56	Die stroke	mm	+ 28
15	15.0-18.0	56	Master die shoe length	mm	75
18	18.0-21.0	56	Motor	kW	2.2
21	21.0-24.0	56	Standard voltage	V	400+neutral
24	24.0-27.0	56	Optional voltages	220V 3ph	
27	27.0-30.0	56		220V 1ph - 12/24V	
30	30.0-33.0	56	Swaging force	kN	1370
33	33.0-36.0	75	Number of swaging/hour		450
36	36.0-39.0	75	Noise level	dB A	72
39	39.0-45.0	75	Protection class		IP 55
45	45.0-48.0	75	Dimensions:		
48	48.0-51.0	75	Length	mm	600
51	51.0-56.0	75	Width	mm	400
			Height	mm	490
			Weight (with oil)	kg	90

#### MAIN APPLICATIONS

It is a low cost professional machine for small-medium size hose range - It is dedicated to small maintenance repair shops, agriculture machines repair shops, maintenance departments of dealers and companies using fleets of hydraulic machinery - It is also the first level for hydraulic maintenance specialists, where productivity is not requested - Mobile van application with the version 12/24V for on-site repair is also possible.



#### KEY PERFORMANCE

Compact ▪ Short head ▪ Protection of the micrometer and of the cylinder ▪ Large opening ▪ Integrated die storage ▪ Low weight ▪

#### OPTIONAL



Quick change panel **OCP** or table **OCT**

#### APPLICABLE PRODUCT RANGE

HOSE TYPE	FITTING TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>1.1/4"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>1.1/4"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex
	MF2000 InterLock, Xtralock	<b>3/4"</b>	
<b>6 wire spirals</b>	MF3000 OPS	<b>Not applicable</b>	-
	MF2000 InterLock, Xtralock		

**WARNING:** Possible limitations in case of double elbow assembly.

## BENCHTOPS

### MB 137 S

#### WORKSHOP SWAGING



DIE SIZES			TECHNICAL SPECIFICATIONS		
N.	Swaging range	L (mm)	Swaging range	mm	4 - 56
12	12.0-15.0	56	Die stroke	mm	+ 28
15	15.0-18.0	56	Master die shoe length	mm	75
18	18.0-21.0	56	Motor	kW	3.0
21	21.0-24.0	56	Standard voltage	V	400
24	24.0-27.0	56	Optional voltages	220V 3ph 220V 1ph - 12/24V	
27	27.0-30.0	56	Swaging force	kN	1370
30	30.0-33.0	56	Number of swaging/hour		850
33	33.0-36.0	75	Noise level	dB A	66
36	36.0-39.0	75	Protection class		IP 55
39	39.0-45.0	75	Dimensions:		
45	45.0-48.0	75	Length	mm	600
48	48.0-51.0	75	Width	mm	390
51	51.0-56.0	75	Height	mm	600
			Weight (with oil)	kg	120

#### MAIN APPLICATIONS

It is a low cost professional machine for small-medium size hose range - It is dedicated to maintenance repair shops, agriculture machines repair shops, maintenance departments of dealers and companies using fleets of hydraulic machinery - It is also the first level for hydraulic maintenance specialists.



#### KEY PERFORMANCE

**Compact** ▪ **Short head** ▪ **Protection of the micrometer and of the cylinder** ▪ **Large opening** ▪ **Easy die set up with quick change tool QCG** ▪

#### OPTIONAL



Semi-automatic opening  
**SAO**



Electrical foot switch  
**EFS**



Quick change panel **QCP**  
or table **QCT**

#### APPLICABLE PRODUCT RANGE

HOSE TYPE	FITTING TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>1.1/4"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>1.1/4"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex
	MF2000 InterLock, Xtralock	<b>3/4"</b>	
<b>6 wire spirals</b>	MF3000 OPS	<b>Not applicable</b>	-
	MF2000 InterLock, Xtralock		

**WARNING:** Possible limitations in case of double elbow assembly.

### M<sup>B</sup> 240

#### WORKSHOP SWAGING



DIE SIZES			TECHNICAL SPECIFICATIONS		
N.	Swaging range	L (mm)	Swaging range	mm	4 - 76
12	12.0-15.0	56	Die stroke	mm	+ 38
15	15.0-18.0	56	Master die shoe length	mm	100
18	18.0-21.0	56	Motor	kW	4
21	21.0-24.0	56	Standard voltage	V	400
24	24.0-27.0	90	Optional voltages	220V 3ph	
27	27.0-30.0	90		220V 1ph - 12/24V	
30	30.0-33.0	90	Swaging force	kN	2400
33	33.0-36.0	90	Number of swaging/hour		625
36	36.0-39.0	90	Noise level	dB A	66
39	39.0-45.0	90	Protection class		IP 55
45	45.0-51.0	100	Dimensions:		
51	51.0-57.0	100	Length	mm	600
57	57.0-66.0	100	Width	mm	390
66	66.0-70.0	100	Height	mm	630
70	70.0-76.0	100	Weight (with oil)	kg	180

#### MAIN APPLICATIONS

Professional benchtop machine for the most common size of hoses used in hydraulics - It is dedicated to hydraulic maintenance specialists working for medium size machines and equipment, small/medium assemblers for small supplies of hose assemblies.



#### KEY PERFORMANCE

Compact ▪ Narrow head ▪ Large opening ▪ High crimp force ▪ Radial movement of the dies ▪ Protection of the micrometer and of the cylinder ▪ Security by-pass in case of incorrect choice of the dies ▪ Easy die set up with quick change tool QCG ▪

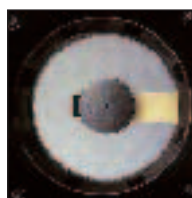
#### OPTIONAL



Semi-automatic opening  
**SAO**



Electrical foot switch  
**EFS**



Backstop:  
Mechanical  
**MBS**  
Electrical  
**EBS**



Quick change panel  
**OCP**  
or table  
**OCT**

#### APPLICABLE PRODUCT RANGE

HOSE TYPE	FITTING TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>2"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>2"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex
	MF2000 InterLock, Xtralock	<b>1.1/4"</b>	
<b>6 wire spirals</b>	MF3000 OPS	<b>1"</b>	Diamondspir, Goldenblast/six
	MF2000 InterLock, Xtralock		

**WARNING:** Possible limitations in case of double elbow assembly.

## BENCHTOPS

### M<sup>B</sup> 340

#### WORKSHOP SWAGING



DIE SIZES			TECHNICAL SPECIFICATIONS		
N.	Swaging range	L (mm)	Swaging range	mm	4 - 130
12	12.0-15.0	56	Die stroke	mm	+ 38
15	15.0-18.0	56	Master die shoe length	mm	125
18	18.0-21.0	56	Motor	kW	5.5
21	21.0-24.0	56	Standard voltage	V	400
24	24.0-27.0	90	Optional voltages	220V 3ph 220V 1ph	
27	27.0-30.0	90	Swaging force	kN	3400
30	30.0-33.0	90	Number of swaging/hour		850
33	33.0-36.0	90	Noise level	dB A	68
36	36.0-39.0	90	Protection class		IP 55
39	39.0-45.0	90	Dimensions:		
45	45.0-51.0	100	Length	mm	690
51	51.0-57.0	110	Width	mm	465
57	57.0-66.0	110	Height	mm	790
66	66.0-73.0	110	Weight (with oil)	kg	270
73	73.0-80.0	125			

#### MAIN APPLICATIONS

Professional machine for a wide range of hoses, with high swaging force even though in a simple benchtop structure. It is dedicated to hydraulic maintenance specialists willing to invest in a powerful machine for a wide hose range including large bore wire braided 2-1/2" and 3". It is also suitable for small OEMs supplies.



#### KEY PERFORMANCE

Large opening ▪ Very high crimp force (is suitable for R13/15 hoses) ▪ Radial movement of the dies  
▪ Protection of the micrometer and of the cylinder ▪ Security by-pass in case of incorrect choice of the dies ▪ Possibility to use large dies for industrial hoses ▪ Easy die set up with quick change tool QCG ▪

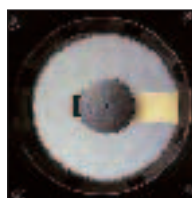
#### OPTIONAL



Semi-automatic opening  
**SAO**



Electrical foot switch  
**EFS**



Backstop:  
Mechanical  
**MBS**  
Electrical  
**EBS**



Quick change panel  
**QCP**  
or table  
**QCT**

#### APPLICABLE PRODUCT RANGE

HOSE TYPE	FITTING TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>3"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	MF2000 Multifit, MF3000 OPB & OPNS MF2000 InterLock, Xtralock	<b>2"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex, Goldenblast
<b>6 wire spirals</b>	MF3000 OPS MF2000 InterLock, Xtralock	<b>2"</b>	Diamondspir up to 2", Goldenblast/six, Rockmaster/13 & 15

**WARNING:** Possible limitations in case of double elbow assembly.



### **m<sup>®</sup>V 240**

#### ELECTRIC MOBILE SWAGING



DIE SIZES			TECHNICAL SPECIFICATIONS		
N.	Swaging range	L (mm)	Swaging range	mm	4 - 76
12	12.0-15.0	56	Die stroke	mm	+ 38
15	15.0-18.0	56	Master die shoe length	mm	100
18	18.0-21.0	56	Motor	kW	2
21	21.0-24.0	56	Standard voltage	V	400
24	24.0-27.0	90	Optional voltages	12/24V	
27	27.0-30.0	90	Swaging force	kN	2400
30	30.0-33.0	90	Number of swaging/hour	n/a	
33	33.0-36.0	90	Noise level	dB A	72
36	36.0-39.0	90	Protection class	IP 55	
39	39.0-45.0	90	Dimensions:		
45	45.0-51.0	100	Length	mm	500
51	51.0-57.0	100	Width	mm	450
57	57.0-66.0	100	Height	mm	580
66	66.0-70.0	100	Weight (with oil)	kg	125
70	70.0-76.0	100			

The battery and the cables are not supplied with the machine.  
Battery specs: DC capacity 100A - Peak supply of 450 A

#### MAIN APPLICATIONS

Professional machine for a wide range of hoses, with high swaging force even though in a simple benchtop structure - Designed for mobile van applications, presents low weight, it is possible as option to have a crimp head separate from the power pack - It is designed for hydraulic maintenance specialists, dedicated to on-site repairs with mobile van, for a wide hose range.



#### KEY PERFORMANCE

Compact ▪ Narrow head ▪ Large opening ▪ High crimp force ▪ Radial movement of the dies ▪ Protection of the micrometer and of the cylinder ▪ Security by-pass in case of incorrect choice of the dies ▪

#### APPLICABLE PRODUCT RANGE

HOSE TYPE	FITTING TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>2"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>2"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex, Goldenblast
	MF2000 InterLock, Xtralock	<b>1.1/4"</b>	
<b>6 wire spirals</b>	MF3000 OPS	<b>1"</b>	Diamondspir, Goldenblast/six
	MF2000 InterLock, Xtralock		

**WARNING:** Possible limitations in case of double elbow assembly.

## STAND-TYPES



### M'S 280

ASSEMBLY MASS PRODUCTION

DIE SIZES			TECHNICAL SPECIFICATIONS		
N.	Swaging range	L (mm)	Swaging range	mm	4 - 130
12	12.0-15.0	90	Die stroke	mm	+ 70
15	15.0-18.0	90	Master die shoe length	mm	100
18	18.0-21.0	90	Motor	kW	5.5
21	21.0-24.0	90	Standard voltage	V	400
24	24.0-27.0	90	Optional voltages		220V 3ph
27	27.0-30.0	90	Swaging force	kN	2800
30	30.0-33.0	90	Number of swaging/hour		1850
33	33.0-36.0	90	Noise level	dB A	< 65
36	36.0-39.0	90	Protection class		IP 55
39	39.0-45.0	90	Standard controls		semi-automatic
45	45.0-51.0	95	Dimensions:		
51	51.0-57.0	110	Length	mm	1060
57	57.0-66.0	110	Width	mm	865
66	66.0-73.0	110	Height	mm	1500
73	73.0-80.0	125	Weight (with oil)	kg	1300

## MAIN APPLICATIONS

Universal professional machine for complete hose range and high production capacity. It is dedicated to professional assemblers for mass production, OEMs assembly shops, large maintenance activities.



### KEY PERFORMANCE

Large opening ▪ High crimp force ▪ QC tool and die pods included ▪ Possibility to use large dies for industrial hoses ▪ Large production capacity ▪ Adjustable semi-automatic opening ▪ Low noise level ▪ Easy die set up with quick change tool QCG ▪ Included mirror for an easy control ▪

## INCLUDED



Semi-automatic opening **SAO**

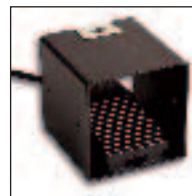


Quick change gun **QCG**

## OPTIONAL



Touch screen display **TSD**



Electrical foot switch **EFS**



Backstop electrical **EBS**

## APPLICABLE PRODUCT RANGE

HOSE TYPE	FITTING TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>3"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	MF2000 Multifit, MF3000 OPB & OPNS MF2000 InterLock, Xtralock	<b>2"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex, Goldenblast
<b>6 wire spirals</b>	MF3000 OPS MF2000 InterLock, Xtralock	<b>2"</b>	Diamondspir up to 2", Goldenblast/six, Rockmaster/13 & 15, Shieldmaster/6000

### MS 400

#### ASSEMBLY MASS PRODUCTION



DIE SIZES			TECHNICAL SPECIFICATIONS		
N.	Swaging range	L (mm)	Swaging range	mm	4 - 160 (*)
12	12.0-15.0	90	Die stroke	mm	+ 85
15	15.0-18.0	90	Master die shoe length	mm	125
18	18.0-21.0	90	Motor	kW	5.5
21	21.0-24.0	90	Standard voltage	V	400
24	24.0-27.0	90	Optional voltages		220V 3ph
27	27.0-30.0	90	Swaging force	kN	4000
30	30.0-33.0	90	Number of swaging/hour		1400
33	33.0-36.0	90	Noise level	dB A	< 65
36	36.0-39.0	90	Protection class		IP 55
39	39.0-45.0	90	Standard controls		semi-automatic
45	45.0-51.0	100	Dimensions:		
51	51.0-57.0	110	Length	mm	1260
57	57.0-66.0	110	Width	mm	930
66	66.0-73.0	110	Height	mm	1690
73	73.0-80.0	125	Weight (with oil)	kg	2000

(\*) 160 mm with special oversized dies

#### MAIN APPLICATIONS

Heavy duty professional machine for large bore wire spiral hoses with heavy fittings. It is dedicated to specialised assembly shops for large OEM's supplies and special applications.



#### KEY PERFORMANCE

Heavy duty swager with: Large opening ▪ High crimp force ▪ QC tool and die pods included ▪ Possibility to use large dies for industrial hoses ▪ Large production capacity ▪ Adjustable semi-automatic opening ▪ Low noise level ▪ Easy die set up with quick change tool QCG ▪ Included mirror for an easy control ▪

#### INCLUDED



Semi-automatic opening **SAO**



Quick change gun **QCG**

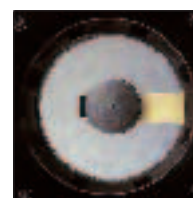
#### OPTIONAL



Touch screen display **TSD**



Electrical foot switch **EFS**




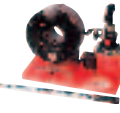







Backstop electrical **EBS**

#### APPLICABLE PRODUCT RANGE

HOSE TYPE	FITTING TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	MF2000 Multifit, MF3000 OPB & OPNS	<b>3"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	MF2000 Multifit, MF3000 OPB & OPNS MF2000 InterLock, Xtralock	<b>3"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex, Goldenblast
<b>6 wire spirals</b>	MF3000 OPS MF2000 InterLock, Xtralock	<b>3"</b>	Diamondspir up to 3", Goldenblast/six, Rockmaster/13 & 15, Shieldmaster/6000

## DIE SETS

(lengths mm)

Model	die N°																				
	10	12	15	18	21	24	27	30	33	36	39	45	48	51	57	66	70	73	76	90	
<b>MHP 80</b> 	56	56	56	56	56	56	56	56	-	-	56 (*)	-	-	-							
<b>MHP 137</b> 	56	56	56	56	56	56	56	56	70	70	70	70	-	70							
<b>MB 137</b> 	56	56	56	56	56	56	56	56	75	75	75	75	75	75							
<b>MB 137 S</b> 	56	56	56	56	56	56	56	56	75	75	75	75	75	75							
<b>MB 240</b> 	56	56	56	56	56	90	90	90	90	90	90	100	-	100	100	100	100 (**)				
<b>MB 340</b> 	56	56	56	56	56	90	90	90	90	90	90	100	-	110	110	110		125 (**)	125 (**)	125 (**)	
<b>MV 240</b> 	56	56	56	56	56	90	90	90	90	90	90	100	-	100	100	100	100 (**)				
<b>MS 280</b> 	90	90	90	90	90	90	90	90	90	90	90	95	-	110 (**)	110 (**)	110 (**)		125 (**)	125 (**)	125 (**)	
<b>MS 400</b> 	90	90	90	90	90	90	90	90	90	90	90	100	-	110	110	110		125 (**)	125 (**)	125 & 150 (**)	

**BLACK:** die sets of the standard package per each machine.

**WHITE** optional die sets available upon request.

(\*) Master die size

(\*\*) Not compatible with QCG quick change gun

Other special sizes die sets available upon request.



### QUICK CHANGE SYSTEM

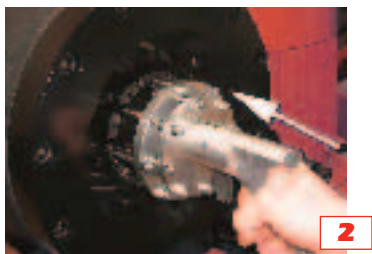
The innovative Quick Change system is available on all our electric swaging machines. It is an essential tool to increase PRODUCTIVITY and COMFORT.

#### FAST, CLEAN and ERGONOMIC

This system offers the possibility to change all the dies at once thanks to an ergonomic Quick Change Gun QCG. The die sets are cleanly organised and stored in die pods on a wall panel or underneath the machine if the Quick Change Table version is chosen.

#### EASY and SAFE

The system has also been designed to be very simple to use. Problems of repetitive breakage of die pins are avoided thanks to the fact that the dies are changed in static position.



#### INSERTING THE DIES

1. Choose the correct die set and take it out of the die rack.
2. Insert the die set in the head, with master dies already closed.
3. Release the die set into the head by pulling the trigger of the QC gun.

#### TAKING THE DIES OUT

4. Once the dies are closed. Insert the QC Gun in the head until the die set is fixed on the magnets of the QC gun.
5. Pull the QC gun out without pulling the trigger. The die set comes out of the head. The die set is held by the magnets on the gun.
6. Place the die set back into the die rack.



The Quick Change System is available in 2 versions:



QCG



QCP



QCT

## CONTROL SYSTEMS

### NUMERICAL VERNIER

This is the standard control offered on our basic machines.

This system is well suited for a machine used in a repair workshop where production is mostly composed of single piece assemblies or of small series of hoses.

The crimping diameter is easily adjusted thanks to a numerical vernier with 3 digits. 100 units on the dial are equivalent to a change of 1 mm of the crimping diameter. Thanks to this 3 digit dial, the adjustment of the crimping diameter can be controlled up to 1/100 mm.



### SAO (Semi-Automatic Opening) CONTROL

The SAO system is ideal for serial hose assemblies.

It is standard included on stand-type machines, optional on benchtop machines.

The crimping diameter is adjusted and controlled thanks to a numerical vernier, like on the standard system.

A knob on the SAO control allows the operator to choose between the manual position (similar to the standard system) or the semi-automatic position.

In semi-automatic position, the dies open automatically after the crimp operation and the operator can adjust this opening so that the dies open just enough to be able to put the next hose in. This reduces considerably the cycle time and increases productivity.



### TSD (Touch Screen Display) DIGITAL CONTROL

The digital control is suitable for single piece production and intensive production.

On our models MS 280, MS 400, the digital control is available with an innovative **Touch Screen** interface (TSD).

The swaging diameter is controlled through a digital interface which will automatically determine which die set will be used.

The operator can choose between manual cycle position when making a single hose assembly or semi-automatic cycle position when starting a series of hose assemblies.

The interface also allows the operator to memorize all the parameters of his most common hose assemblies: crimping diameter, fitting reference, hose reference, opening after crimp, tolerance, dwell time.

The Digital Control allows to store hose assembly combinations which can be immediately recalled. No need to adjust a numerical vernier ! The digital control does it all for you once the data are stored !

The Digital control functions both with mm and inches.





### **22 CUT**

#### HOSE CUTTING

TECHNICAL SPECIFICATIONS		
Motor	kW	2.2
Standard voltage	V	400
Optional voltage		220V 3ph
Blade diameter	mm	300
Speed of the motor	rpm	3000
Max OD of hose	mm	50
Dimensions	mm	500 x 520 x 650
Weight	kg	36

#### Optional

- Brake motor

#### MAIN APPLICATIONS

Basic hose cutting machine, benchtop structure.

It is dedicated to the small-medium sizes of the most common hoses used in hydraulic, for small repair shops, distribution shops.



#### KEY PERFORMANCE

Simple ▪ Sturdy ▪ Large blade, diameter 300 mm (12") ▪ Safety cover ▪

#### APPLICABLE PRODUCT RANGE

HOSE TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	<b>1.1/4"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	<b>1"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex
<b>6 wire spirals</b>	<b>Not applicable"</b>	—

## BENCHTOPS



### **30 CUT** HOSE CUTTING

TECHNICAL SPECIFICATIONS		
Motor	kW	3
Standard voltage	V	400
Optional voltage		220V 3ph
Blade diameter	mm	300
Speed of the motor	rpm	3000
Diameter of the suction connection	mm	Ø 60
Max OD of hose	mm	85
Dimensions	mm	650 x 420 x 700
Weight	kg	57

#### Optional

- Brake motor

#### MAIN APPLICATIONS

High performance hose cutting machine, benchtop structure. It is dedicated to a wide range of the most common hoses used in hydraulics, for small repair shops, distribution centers.



#### KEY PERFORMANCE

Simple and compact ▪ Sturdy ▪ Large blade, diameter 300 mm (12") ▪ Safety cover ▪ Brake motor available in option for immediate stop of the blade = increased safety ▪ Serrated blade available in option ▪

#### APPLICABLE PRODUCT RANGE

HOSE TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	<b>2"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	<b>2"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex
<b>6 wire spirals</b>	<b>1.1/4"</b>	—





### **75 CUT**

HOSE CUTTING FOR MASS PRODUCTION

TECHNICAL SPECIFICATIONS		
Motor	kW	7.5
Standard voltage	V	400
Optional voltage		220V 3ph
Blade diameter	mm	520
Speed of the motor	rpm	3000
Diameter of the suction connection	mm	Ø 110
Max OD of hose	mm	125
Dimensions	mm	910 x 820 x 1280
Weight	kg	215

#### Optional

Pneumatic bending ▪ Dust collector ▪ Brake motor

#### MAIN APPLICATIONS

Professional hose cutting machine with capability on the whole range of hydraulic hoses. It is dedicated to large assembly production units and maintenance/distribution centers.



#### KEY PERFORMANCE

Powerful: can cut 2" R13/15 hoses ▪ Large blade, diameter 520 mm (20.5") ▪ Safety cover ▪ Visibility ▪ Possibility to cut large bore sizes ▪

#### APPLICABLE PRODUCT RANGE

HOSE TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	<b>3"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	<b>2"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex
<b>6 wire spirals</b>	<b>2"</b>	Diamondspir up to 2"

## STAND-TYPES

### **m<sup>®</sup> 110 CUT**

HOSE CUTTING FOR MASS PRODUCTION



#### TECHNICAL SPECIFICATIONS

Motor	kW	11
Electronic soft start to reduce the amp consumption		
Standard voltage	V	400
Optional voltage		220V 3ph
Blade diameter	mm	600
Standard blade		serrated
Speed of the motor	rpm	3000
Diameter of the suction connection	mm	Ø 110
Max OD of hose	mm	125
Dimensions	mm	960 x 870 x 1350
Weight	kg	260

#### Included

Pneumatic bending ▪ Dust collector ▪ Brake motor ▪ Blade cooling

## MAIN APPLICATIONS

Professional hose cutting machine with capability up to large bore wire spiral hoses. It is dedicated to mass assemblies productions and large distribution maintenance centers.



#### KEY PERFORMANCE

Powerful: can cut 3" with 6 wire spirals hoses ▪ Large blade, diameter 600 mm (24") ▪ Electronic soft start ▪ Electric brake ▪ Pneumatic bending ▪ Blade cooling ▪ Safety cover ▪ Visibility ▪

## APPLICABLE PRODUCT RANGE

HOSE TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	<b>3"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	<b>3"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex
<b>6 wire spirals</b>	<b>3"</b>	Diamondspir up to 3"

# SKIVING MACHINES



## **205 SKY**

EXTERNAL/INTERNAL SKIVING

TECHNICAL SPECIFICATIONS		
Motor	kW	0.75
Standard voltage	V	400
Optional voltage		220V 3ph
Rotation speed	rpm	205
Dimensions	mm	1130 x 580 x 550
Weight	kg	130

### **Optional**

Rotation speed adjustment

## MAIN APPLICATIONS

Professional skiving machine, for internal and external skiving operations.



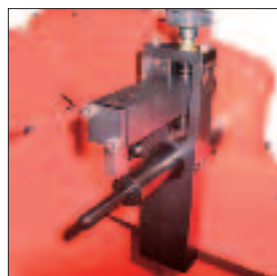
### KEY PERFORMANCE

Compact ■ Stable ■ Large tray to collect the rubber ■ Dual safety: cover and tray ■ Mandrels are hardened and pre-set according to the Manuli skiving lengths ■ Easy adjustment of the external skiving depth ■

## APPLICABLE PRODUCT RANGE

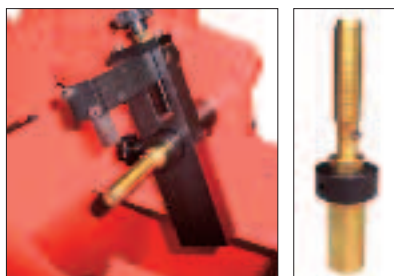
HOSE TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	<b>2"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Multitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	<b>2"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex
<b>6 wire spirals</b>	<b>2"</b>	Diamondspir, Rockmaster/15

### External skiving tool



From 3/16" to 2"

### Internal skiving tool



From 3/8" to 2"

# INSERT PUSHING MACHINES

## **11<sup>®</sup> 1500 INS**

### COUPLING INSERTER



TECHNICAL SPECIFICATIONS		
Capacity	from 1/4" to 2"	
Push force on the fitting	daN	1500 at maximum hydraulic pressure of 120 bar
Hose clamping	daN*	550 with 7 bar of air pressure
Minimum hose OD	mm	28
Maximum hose OD	mm	73 mm
Supplied with hydro-pneumatic foot pump		
Dimensions	mm	750 x 660 x 300
Weight	kg	70

### MAIN APPLICATIONS

Professional insert pushing machine for assemblers involved in relevant productions and for small repair shops as well.



#### KEY PERFORMANCE

Compact ■ Robust construction ■ Powerful ■

### OPTIONAL



1/4", 3/8", 1/2" shell  
for these hose sizes

### APPLICABLE PRODUCT RANGE

HOSE TYPE	MAX. HOSE SIZE	REF. HOSES
<b>2 wire braids and textile</b>	<b>3"</b>	Tractor, Harvester, Lyteflex, Pilot, Cover, Equator, Rockmaster & Shieldmaster braided, Adler, Astro, Unitex, Powerplast, Hydroplast, Spirtex/K
<b>4 wire spirals</b>	<b>2"</b>	Goldenspir, Rockmaster & Shieldmaster spiral, Xtraflex
<b>6 wire spirals</b>	<b>2"</b>	Diamondspir up to 2"



## HOW TO ORDER

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Swaging machines are considered with a standard die set package (reference enclosed table).  
The other die sets are considered as optional



Eventual special or single die sets can be ordered with their respective code



The voltage option must be clearly specified as described in the catalogue (basic solution or optional)



Optionals must be specified in the order of the machine:  
(e.g. MB 240 - SAO - EFS - OCT)



### PACKAGING

Fumigated pallet and wooden boxes are the standard packaging



### DOCUMENTS

Documents included in the package are:

- the user manual
- "CE Certificate" (included in the user manual)



### CONTACTS:

To place your orders or for other information please contact your Local MRI Sales Branch.

## WARRANTY

Manuli® products are part of an engineered system, which must be assembled and used specifically and strictly in accordance with Manuli® instructions and limitations.

Don't mix and match: use always Manuli® original couplings and hoses.

Manuli® hose, couplings and assembling machines are tested as an effective and reliable assembly system and the use of other products and or assembly machines may produce hose assemblies that will not meet rated performance. Avoiding to follow any of Manuli® instructions and limitations could lead to premature hose failures resulting in property damage, serious injury or death.

Warranty shall apply only if the customer uses hose, fittings, hose fitting components and assembly equipment specifically tested and approved by Manuli®.

MANULI® DISCLAIMS ANY WARRANTIES, EXPRESS OR IMPLIED, AND ASSUMES NO RESPONSIBILITY OR LIABILITY FOR ANY LOSS OR DAMAGE, WHETHER DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL WHICH MIGHT ARISE OUT OF CRIMPED HOSE ASSEMBLIES NOT PRODUCED FROM GENUINE MANULI® HOSE FITTINGS, HOSE AND EQUIPMENT, IN CONFORMANCE WITH MANULI® PROCESS SPECIFICATIONS FOR EACH SPECIFIC HOSE ASSEMBLY.

Assembly machines noted in this catalogue are for reference purposes only. Manuli® swaging chart is the official guide for selecting appropriate hose and coupling combinations and determining crimped compatibility. Revision of Manuli® swaging chart are progressively re-issued taking under consideration new products and their modifications.

### WARNING !

Failure or improper selection or improper use of any of the products found on this Manuli catalogue or related items can cause death, personal injury and/or property damage. Before using any product, it is important that you analyze all aspects of your application and review the information explained in the current catalogue.

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  - 2.B) By e-mail
  - 2.C) On-line, only in the case of Buyers previously authorized to do so by means of a suitable activation procedure. This activation is essential if orders are to be placed on-line. The Buyer activation is by allocation of an identity code (user-id) and password to enable it to be recognized each time an order is placed, and takes place by filling in and returning the schedule set out in the home page of MRI's web site as described in the Request for Information section. The Buyer has the right to refuse the request for activation or cancel an existing activation.
3. **Contract Formation.** All orders for MRI goods are subject to written acceptance by MRI by e-mail, fax or post. For on-line orders to MRI as described in point 2.C above, the authorized Buyer is first identified through his user-id and password, then selects the products, quantities and delivery address as guided by the system and issued the supply order. The order sent to MRI on-line is accepted only if specifically confirmed by this latter by e-mail, fax or post.

Any and all terms in Buyer's purchase orders, acknowledgments, confirmations, or other business forms ("Buyer's Forms") which vary, conflict with or add to, or are in any way inconsistent with, the terms provided below are REJECTED by MRI and shall not be part of any agreement between the Buyer and MRI unless specifically agreed to in a writing document signed by MRI. MRI's acceptance of a purchase order or the commencement of performance by MRI shall neither change nor add to this Agreement; THE TERMS PROVIDED BELOW SHALL PREVAIL OVER ANY VARYING, ADDITIONAL OR CONFLICTING TERMS IN THE BUYER'S FORMS. For all on-line orders, these Standard Terms and Conditions of Sale, as available to the Buyer on the web site [www.manuli-hydraulics.com](http://www.manuli-hydraulics.com), are applicable.
4. **Information made available to the Buyer.** Before the issue of the purchase order, MRI will provide the Buyer with all the commercial information on the products that it may require. After the order has been placed, MRI will inform the Buyer of the stages of the order through MRI service structure or, for those Buyers in possession of User\_ID and Password, through MRI's web site.
5. **Prices.** MRI reserves the right to alter the prices, discounts and payment conditions in force when the contract is confirmed and the Buyer expressly acknowledges and agrees upon such right. However, any modifications will become effective after notification of these has been issued, and they will apply only to the part of the supply that has not been completed. In such a case the Buyer may cancel the contract for the part not completed within 2 (two) weeks of the issue of notification of the increase and MRI shall have no liability, directly or indirectly, whatsoever.
6. **Taxes.** Prices do not include country, federal, state or local taxes, now or hereafter enacted, applicable to the goods sold, which tax or taxes will be added by MRI to the sales prices where MRI has the legal obligation to collect them, and will be paid by the Buyer or reimbursed by the Buyer to MRI if paid by MRI, unless the Buyer provides MRI with a proper tax exemption certificate.
7. **Shipping, Title and Delivery.** Shipments shall be EXW as such term is defined in the Incoterms 2000, unless differently agreed upon in writing. Shipping dates are approximate and are based to a great extent on prompt receipt by MRI of all necessary information from the Buyer. MRI shall not be liable for any loss or expense incurred by the Buyer in the event that MRI fails to meet the specified delivery schedule(s) due to production or other delays due to unforeseen circumstances.
8. **Returns.** MRI will accept returns only upon prior agreement and at conditions to be defined between the parties.
9. **Tolerances.** Due to MRI's requirements, tolerances of +/-10% of the confirmed quantities, as and if applicable, are always allowed and accepted.
10. **Payment.** Payment shall be made within the agreed upon period from the date of invoice, in the agreed upon currency at the address shown on the invoice. If payment in full is not received by MRI by the due date, the Buyer shall be in breach hereof. The Buyer will incur a charge of 0.6% per month on the unpaid balance to cover the administration costs of collection. Such charges may be in addition to other remedies exercisable by MRI. The amount of credit may be changed or credit withdrawn by MRI at any time. On any order on which credit is not extended by MRI, shipment or delivery shall be made, at MRI's election, Cash on order (in whole or part), letters of credit with all costs of collection paid by the Buyer or other terms as agreed between the parties.
11. **Suspension of the Contract.** Should the Buyer fail to comply in whole or in part even with only one of the supply conditions or if there are any changes of any kind in the Buyer's company name, form or trading capacity, as well as in the event of proven difficulty in meeting the payments to MRI or third parties, MRI will have the right to suspend any further deliveries and convert any premiums that have matured, bank transfers or other deeds of payment unless a suitable guarantee is issued.
12. **Force Majeure.** MRI shall not be responsible for any delay or failure to perform due to causes beyond its reasonable control. These causes shall include, without limitation, fire, flood, earthquake, accident, acts of the public enemy, war, acts of terrorism, riot, epidemic, quarantine restrictions, labor dispute, labor shortages, interruption of transportation, inability to secure raw materials or machinery, extraordinary increases in such raw materials prices, rationing or embargoes, acts of God, acts of Government or any agency thereof, acts of any state or local government or any agency thereof, and judicial action. Similar causes shall excuse the Buyer for failure to take goods ordered by the Buyer, provided reasonable notice is given to MRI of such contingency. However, the Buyer shall not be excused from the terms hereof for (i) any goods shipped prior to receipt of such notice; or (ii) goods already in transit when the contingency occurs.
13. **Limitation of Liabilities.** THE BUYER AND MRI AGREE THAT (I) THE SOLE AND EXCLUSIVE REMEDIES FOR BREACH OF ANY WARRANTY CONCERNING THE GOODS SHALL BE REPAIR OR REPLACEMENT OF THOSE GOODS OR THEIR COMPONENT PARTS OR REFUND OF THE PURCHASE PRICE; AND (II) MRI SHALL HAVE THE EXCLUSIVE RIGHT TO SELECT ANY SUCH REMEDY IN ITS SOLE DISCRETION.

MRI SHALL NOT BE LIABLE FOR CONTINGENT, INCIDENTAL OR CONSEQUENTIAL DAMAGES TO PERSONS OR PROPERTY AND MRI'S SOLE LIABILITIES AND BUYER'S EXCLUSIVE REMEDIES HEREUNDER ARE AS PROVIDED IN THESE STANDARD TERMS AND CONDITIONS OF SALES. MRI SHALL NOT BE LIABLE FOR ANY EXCESS REPROCUREMENT COSTS, SPECIFIC PERFORMANCE OR DELAY IN DELIVERY.


# SALES TERMS & CONDITIONS

Notwithstanding any implication to the contrary, MRI shall have no liability whatsoever unless and until the Buyer shall have paid the full purchase price of all goods delivered.

14. **Warranty and claims.** MRI warrants that the Products will be free of defects in material and workmanship for a period equal to twelve (12) months from the date of shipping from MRI to the Buyer or, with the sole exception of assembly machines, within two thousand (2000) hours of use, whichever comes first. In case of claims presented in the correct way and regarded as founded, MRI agrees to replace or repair the defective product when these are returned to its premises.
- a. This warranty does not cover any faults caused by normal deterioration, accelerated deterioration caused by special physical, chemical or electrochemical conditions, insufficient maintenance or incorrect repair, failure to follow the storage, user and operating instructions, use of unsuitable materials, the effects of a chemical or electrolyte process, assembly operations not carried out using only MRI's original parts or MRI's original certified parts, using MRI's assembly machines and in strict accordance with MRI's latest assembly instructions to be found always updated at [www.manuli-hydraulics.com](http://www.manuli-hydraulics.com), or any other faults arising as a result of circumstances over which the supplier has no control. This warranty does not cover faults caused by modifications made by the customer or a third party, or assembly or installation operations carried out by these latter without observance of the operating and installation conditions and/or the technical specifications of the products.
- b. IN NO EVENT SHALL MRI BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. NO PRODUCT IS WARRANTED AS BEING FIT FOR A PARTICULAR PURPOSE. The warranties described above apply only if (i) the Product has not been misused, tampered or abused in any manner nor have repairs been attempted thereon; (ii) written notice of failure within the warranty period is forwarded to MRI and MRI's direction for properly identifying Products returned under warranty are followed; and (iii) with the return, a notice authorizing MRI to examine and disassemble returned Products to the extent MRI deems it necessary to ascertain the cause of failure. The warranties stated herein are exclusive. THERE ARE NO OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED, BEYOND THOSE SET FORTH HEREIN, and MRI does not assume any other obligation or liability in connection with the sale or use of the Products.
- c. The receipt by the Buyer or its customer(s) of any of the Products shall constitute the Buyer's unqualified acceptance of same and waiver by the Buyer of all claims hereunder (OTHER THAN CLAIMS NOT DISCOVERABLE UPON RECEIPT AND INSPECTION) unless the Buyer gives written notice of the same to MRI within eight (8) days after its receipt or, in the event of concealed defects, the claim should be sent to MRI in writing within eight (8) days of their discovery, and in any case within a period of twelve (12) months from shipping from MRI to the Buyer, or, with the sole exception of assembly machines, within two thousand (2000) hours of use, whichever comes first. In any case, whenever possible, the Buyer shall send MRI a sample of the defective product to follow up the claim procedure.
- d. No claim of any kind, where as to Products delivered or for delay in delivery or failure to deliver, and whether or not based on negligence, shall be greater in amount than the purchase price of the Products with respect to which such claim is made. IN NO EVENT SHALL MRI BE LIABLE FOR INDIRECT, INCIDENTAL SPECIAL, OR CONSEQUENTIAL DAMAGES, WHETHER OR NOT CAUSED BY OR RESULTING FROM THE NEGLIGENCE THEREOF. It is expressly understood that any technical advice furnished by MRI with respect to the use of the Products, shall not be deemed to be a representation that the Products may be so used successfully or that such use will offer any specific result, and MRI does not assume any obligation or liability for any advice given or results obtained.
- e. The Buyer shall indemnify and hold MRI harmless against any and all loss damage, cost, or expense of any kind incurred by reason of any negligence, breach or other fault of the Buyer imposed by law upon MRI for damages assessed because of property damage or bodily injuries or death sustained or resulting from the sale, use, or handling of the Products except to the extent caused by the negligence of or breach of this Agreement by MRI, and the MRI has notified the Buyer in writing of any third party's claims or demands within sixty (60) days after MRI received notice thereof.
15. **Reserve.** For the orders sent to MRI on-line, these will be accepted only after the correct completion of the activation procedure described in point 2.C above, which takes place using a user-id and password. The Buyer is aware that the revelation of the user-id and password to unauthorized parties would enable these to make orders in his name. Consequently, the Buyer will guard his identity code and password with maximum diligence and reserve, as he will be held responsible for any abusive use of these. MRI will take no responsibility for abusive use of the user-id and password, and the order will remain fully valid and effective after confirmation of it has been issued.
- a. The Buyer agrees to exonerate MRI from any action, request or claim, including claims for compensation for damages, deriving directly or indirectly from the use or abuse of the user-id and password by any party.
- b. The Buyer agrees to inform MRI of the loss or theft of the password, whereupon MRI will deactivate the password in question and issue a new one.
16. **Entire Agreement.** THESE TERMS AND CONDITIONS, INCLUDING THE LIMITED WARRANTY AND DISCLAIMER AND LIMITATIONS OF LIABILITY, ARE A COMPLETE AND FULL EXPRESSION OF THE AGREEMENT BETWEEN THE PARTIES. The terms hereof may not be varied, supplemented, qualified, modified, waived or interpreted by any prior or subsequent course of performance or conduct between the parties (including the shipment of goods hereunder) or by any usage of the trade or by conflicting or additional terms upon the face or reverse of any form to which this is attached or a part of, nor may it be modified by any agent, employee, or representatives of MRI unless such modification or representation is made in writing and signed by a duly authorized officer of MRI. Stenographic or clerical errors are subject to correction.
17. **Severability.** If any term of this Agreement is held to be illegal or unenforceable, such term shall be severed from this Agreement and the remaining terms shall remain in force.
18. **Assigns.** This Agreement shall be binding on and inure to the benefit of the successors and assigns of the entire business and goodwill of either MRI or Buyer, or of that part of the business of either used in the performance of such contract, but shall not be otherwise assignable by Buyer.
19. **Proprietary Rights.** Trademarks, service marks and other product identifications are MRI's property at all times and shall only be used in connection with the products. The Buyer shall not remove or deface any such marks.
20. **Correspondence.** All correspondence regarding this contract will be sent to MRI's Customer Service structure:  
fax: +48 32 2220147;  
help desk: +48 32 2220222;  
email address: [customerservice@manulirubber.com](mailto:customerservice@manulirubber.com)
21. **Interpretation.** The validity, performance and construction of these terms and conditions and any sale made hereunder shall be governed by the laws of the Italy. All the terms hereof shall be interpreted in the manner which enhances its enforceability.



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info@manulirubber.com

## Legends:

 **Corporate Headquarters**

 **Distribution Companies**

 **MRO Sales Branches & Warehouse**

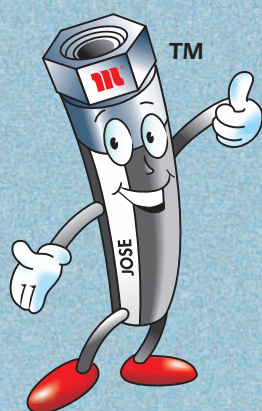
 **OEM Assembly Units**

 **Refrigeration Connectors Sales & Product Management**

C O N T A C T :

Please refer to your local MRI sales branch or contact person





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